As of 050800W Dec11

Joint Frequency Management Office Pacific (JFMO PAC)

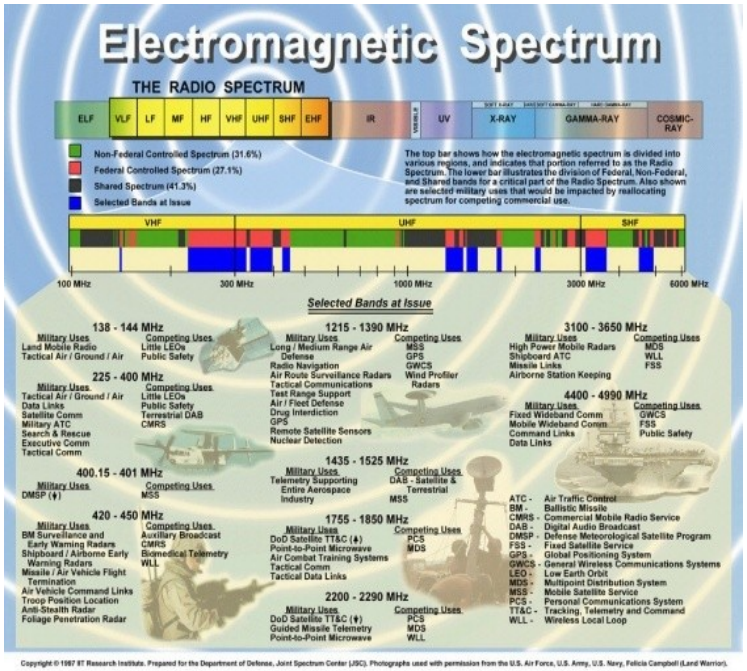
U.S. Pacific Command Spectrum Update

Chief Spectrum Manager
13 December 2011

As of 050800W Dec11

Mission

- **Conduct theater spectrum management**
- **Coordinate spectrum certification**
- **Provide spectrum policy, guidance, and leadership throughout the AOR**
- **Adhere to International, U.S. National, DoD and Host Nation Radio Regulations**


Electromagnetic Spectrum
THE RADIO SPECTRUM
ELF VLF LF MF HF VHF UHF SHF EHF IR UV X-RAY GAMMA-RAY COSMIC-RAY
Non-Federal Controlled Spectrum (31.6%)
Federal Controlled Spectrum (27.1%)
Shared Spectrum (41.3%)
Selected Bands at Issue
The top bar shows how the electromagnetic spectrum is divided into various regions, and indicates that portion referred to as the Radio Spectrum. The lower bar illustrates the division of Federal, Non-Federal, and Shared bands for a critical part of the Radio Spectrum. Also shown are selected military uses that would be impacted by reallocating spectrum for competing commercial use.
VHF UHF SHF
100 MHz 300 MHz 1000 MHz 3000 MHz 6000 MHz
Selected Bands at Issue
138 - 144 MHz
Military Uses: Land Mobile Radio; Tactical Air / Ground / Air
Competing Uses: Little LEOs; Public Safety
225 - 400 MHz
Military Uses: Tactical Air / Ground / Air; Data Links; Satellite Comm; Military ATC; Search & Rescue; Executive Comm; Tactical Comm
Competing Uses: Little LEOs; Public Safety; Terrestrial DAB; CMRS
400.15 - 401 MHz
Military Uses: DMSP (↓)
Competing Uses: MSS
420 - 450 MHz
Military Uses: BM Surveillance and Early Warning Radars; Shipboard / Airborne Early Warning Radars; Missile / Air Vehicle Flight Termination; Air Vehicle Command Links; Troop Position Location; Anti-Stealth Radar; Foliage Penetration Radar
Competing Uses: Auxiliary Broadcast; CMRS; Biomedical Telemetry; WLL
1215 - 1390 MHz
Military Uses: Long / Medium Range Air Defense; Radio Navigation; Air Route Surveillance Radars; Tactical Communications; Test Range Support; Air / Fleet Defense; Drug Interdiction; GPS; Remote Satellite Sensors; Nuclear Detection
Competing Uses: MSS; GPS; GWCS; Wind Profiler Radars
1435 - 1525 MHz
Military Uses: Telemetry Supporting Entire Aerospace Industry
Competing Uses: DAB - Satellite & Terrestrial; MSS
1755 - 1850 MHz
Military Uses: DoD Satellite TT&C (↑); Point-to-Point Microwave; Air Combat Training Systems; Tactical Comm; Tactical Data Links
Competing Uses: PCS; MDS
2200 - 2290 MHz
Military Uses: DoD Satellite TT&C (↑); Guided Missile Telemetry; Point-to-Point Microwave
Competing Uses: PCS; MDS; WLL
3100 - 3650 MHz
Military Uses: High Power Mobile Radars; Shipboard ATC; Missile Links; Airborne Station Keeping
Competing Uses: MDS; WLL; FSS
4400 - 4990 MHz
Military Uses: Fixed Wideband Comm; Mobile Wideband Comm; Command Links; Data Links
Competing Uses: GWCS; FSS; Public Safety
ATC - Air Traffic Control
BM - Ballistic Missile
CMRS - Commercial Mobile Radio Service
DAB - Digital Audio Broadcast
DMSP - Defense Meteorological Satellite Program
FSS - Fixed Satellite Service
GPS - Global Positioning System
GWCS - General Wireless Communications Systems
LEO - Low Earth Orbit
MDS - Multipoint Distribution System
MSS - Mobile Satellite Service
PCS - Personal Communications System
TT&C - Tracking, Telemetry and Command
WLL - Wireless Local Loop
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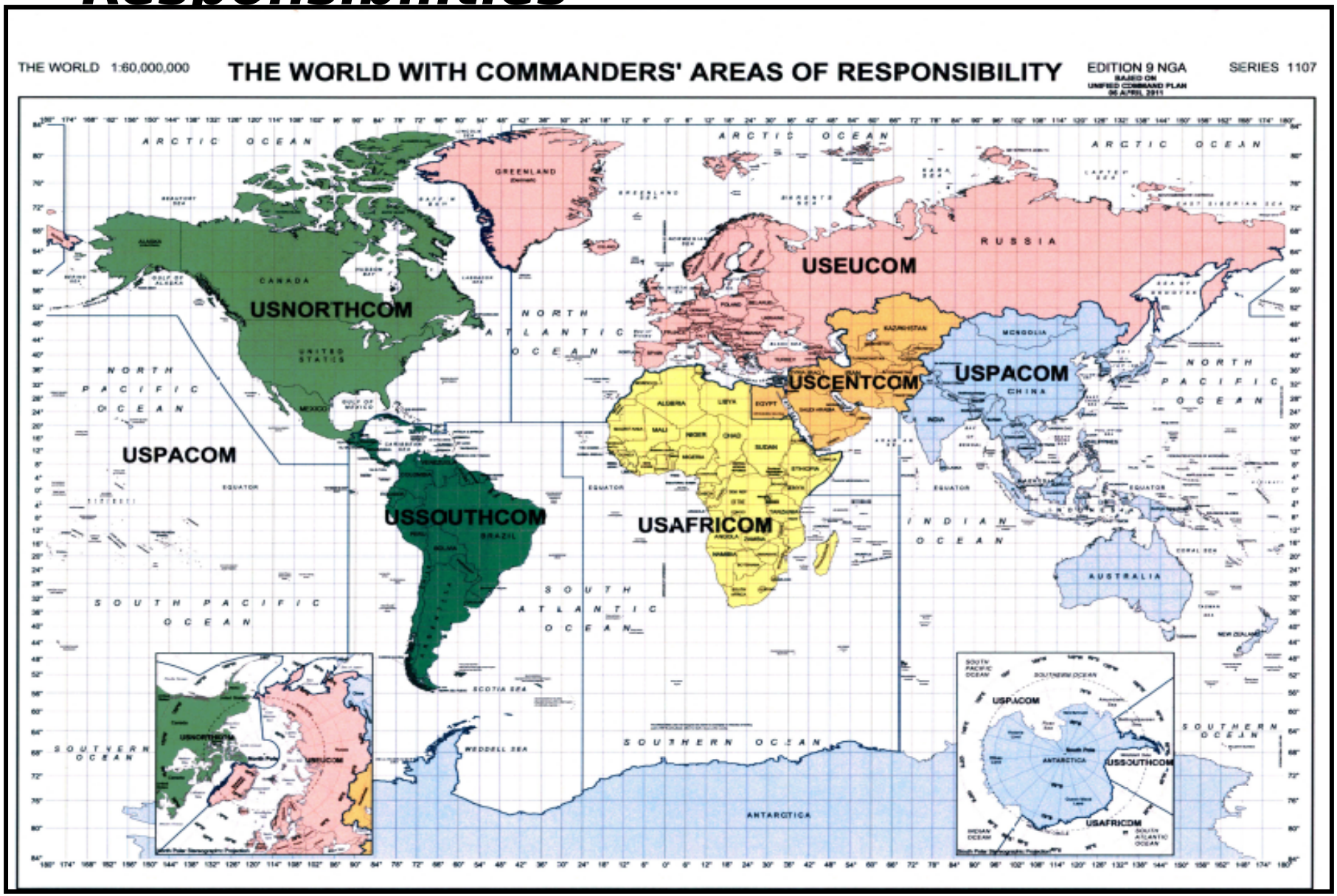
Combatant Commands Area of Responsibilities



Responsibilities

- Serve as the single point for spectrum usage in the Pacific AOR
- Maintain liaison with:
  - National / International
  - Joint Agencies
  - State Department under the " Freely Associate States"
- Coordinate/clear electronic warfare training frequencies
- Participate in the Joint Commander's Electronic Warfare Staff (J39)
- Provide guidance to Joint Task Force
- Report and resolve short/long term "Radio Frequency Interference"
- Pacific RIM spectrum supportability coordination

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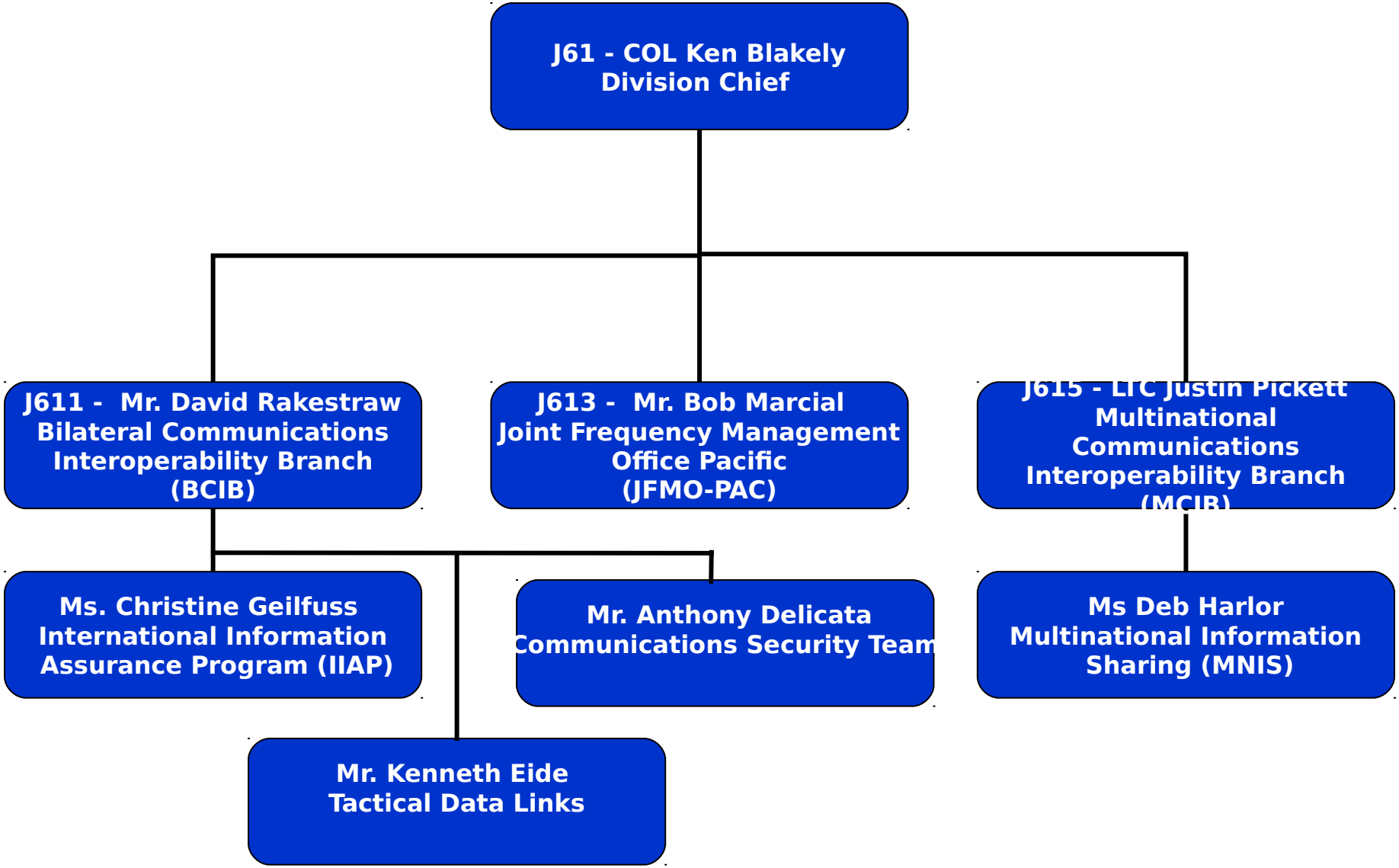
USPACOM J61 Division Organizational Chart



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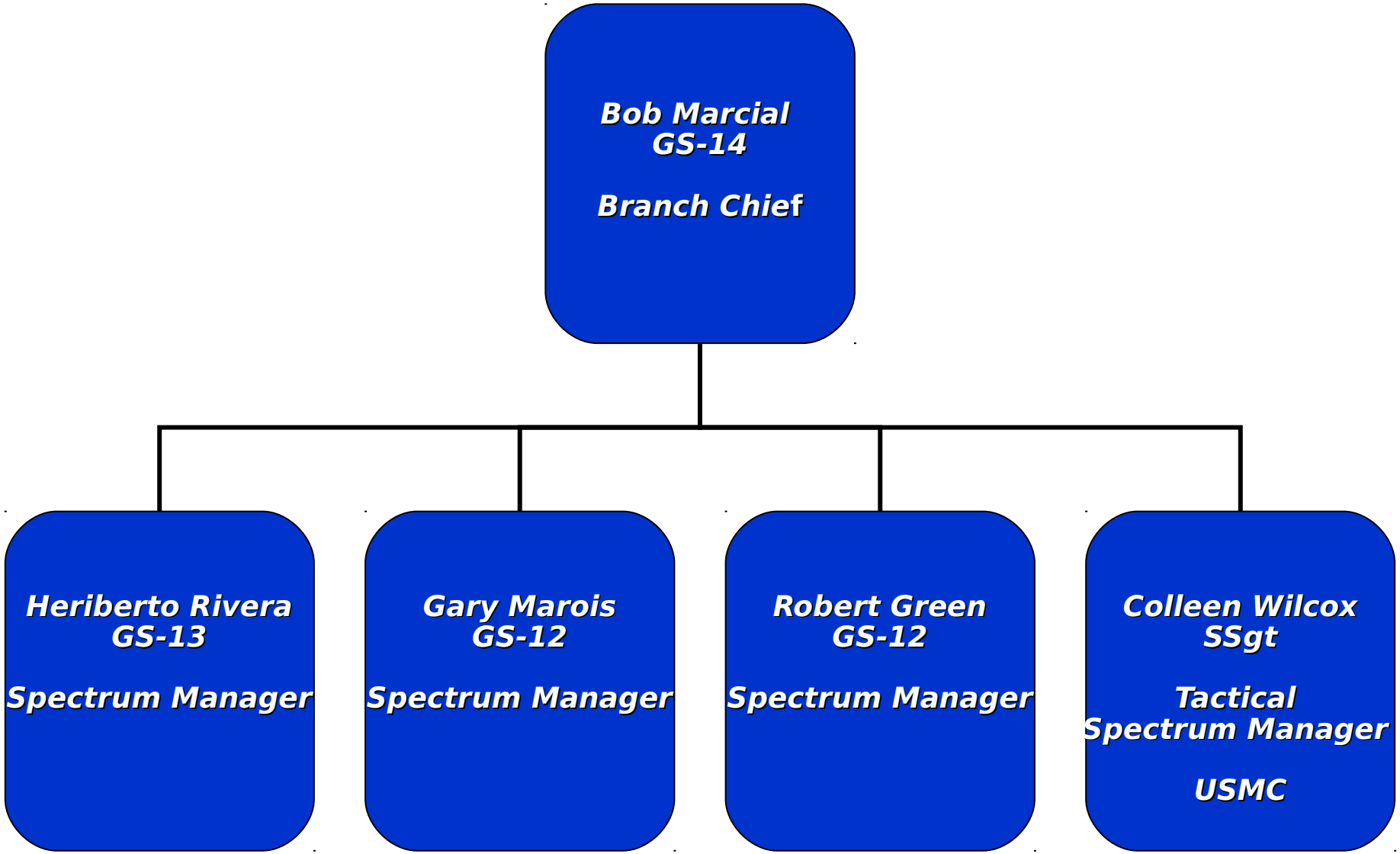
Joint Frequency Management Office Pacific Organizational Chart



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USPACOM Spectrum Management Major Events/ Efforts/Accomplishments in 2011

- Exercise Support – 150
- Spectrum Certification - 95
- Real World Operational Support – JSOTF - Philippines
- Humanitarian / Disaster Relief Operation - (Operation Tomodachi)
- Joint Tactical Radio System – Japan / Korea
- Wideband Global SATCOM (Ka Band)
- Unmanned Aerial Systems (Global Hawk)
- Presidential Visit Support
- Last NASA Space Transportation Shuttle 135 Launch
- Annual Pacific Spectrum Management Conference
- Pacific Endeavor 2011 - “Spectrum Collaboration Application”
- Asia-Pacific Economic Cooperation

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USPACOM Spectrum Management Major Events/ Efforts/Accomplishments for 2012

- ***Spectrum XXI Online Training***
  - ***U.S. Pacific Command***
    - ***17 - 28 January; 16 Students***
  - ***U.S. Forces Japan***
    - ***6 - 17 February; 12 Students***
  - ***U.S. Forces Korea***
    - ***TBD; 24 Students***
  - ***Alaskan Command***
    - ***TBD; 7 Students***

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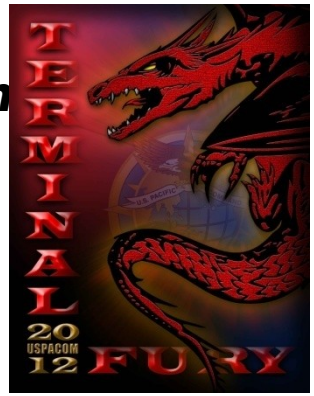
USPACOM Spectrum Management Major Events/ Efforts/Accomplishments for 2012

- ***Terminal Fury 12***
  - *Middle Planning Conference; 29 Nov - 2 Dec; Hon*
  - *Final Planning Conference; 13 - 16 Mar*
  - *Exercise Part # 1; 30 Apr - 4 May*
  - *Exercise Part # 2; 18 - 23 May*



- ***Pacific Endeavor 12***
  - *Staff Workshop # 1*
    - *05 - 09 Feb; Dhaka Bangladesh*
  - *Staff Workshop # 2*
    - *16 - 20 Apr; Republic of the Philippines*
  - *Staff Workshop # 3*
    - *04 - 08 Jun; Kingdom of Cambodia*
  - *Exercise Pacific Endeavor*
    - *06 - 17 Aug; Republic of Singapore*

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Royal Australian Air Force Base Darwin Australia; Robertson Barracks

- Marines to be based in Darwin Australia
- Biggest deployment since World War II
  - 250 Marines will arrive next year, eventually being built up to 2,500
- Exercise Talisman Saber 2011
  - Frequency Usage: 1195 Assignments

Frequency Bands Controlled by Defence Australia

Major Issues / Concerns

From MHz	To MHz	Amount	Type of Use	Means
32	33	1M00	AUS1	Any Use
34	35	1M00	AUS1	Any Use
38	39	1M00	AUS1	Any Use
41	42	1M00	AUS1	Any Use
43	44	1M00	AUS1	Any Use
230	328.6	98M6	AUS1	Any Use
335.4	399.9	65M5	AUS1	Any Use
430	440	10M0	AUS11	Radiolocation
440	450	10M0	AUS11	Radiolocation
915	928	13M0	AUS11	Radiolocation
1240	1400	160M	AUS1	Any Use
3100	3300	200M	AUS1	Any Use
3300	3400	100M	AUS11	Radiolocation
4400	4800	400M	AUS1	Any Use
4800	4990	190M	AUS11	Fixed & Mobile
5255	5350	95M0	AUS1	Any Use
5725	5850	125M	AUS11	Radiolocation
7250	7375	125M	AUS1	Any Use
7975	8025	50M0	AUS1	Any Use
8500	8750	250M	AUS1	Any Use
9800	10000	200M	AUS11	Radiolocation
1000	10450	450M	AUS11	Radiolocation
10450	10500	50M0	AUS11	Radiolocation

From GHz	To GHz	Amount	Type of Use	Means
14.7145	15.1365	422M	AUS1	Any Use
15.7000	16.6000	900M	AUS1	Any Use
16.6000	17.1000	500M	AUS11	Radiolocation
17.1000	17.2000	100M	AUS1	Any Use
20.2000	21.2000	1G00	AUS1	Any Use
24.0500	24.2500	200M	AUS11	Radiolocation
30.0000	31.0000	1G00	AUS1	Any Use
33.4000	34.2000	800M	AUS1	Any Use
34.7000	35.2000	500M	AUS1	Any Use
37.0000	37.5000	500M	AUS1	Any Use

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Humanitarian Assistance / Disaster Relief

Indian Ocean Tsunami
26 December 2004

American Samoa
9 September 2009

Haiti
12 January 2010

Republic of the Philippines
25 March 2010

Japan Tsunami
11 March 2011

Thailand Floods
4 November 2011

What is required for the Pacific AOR "Unclassified Internet" Spectrum Collaboration Application

Supports:

- Humanitarian Assistance / Disaster Relief
- Joint, Coalition and Combined Operations

mercury

"One Common Operating Picture and Interoperability throughout the Pacific AOR"

How is J61 approaching this?

- In conjunction with DISA Joint Spectrum Center and J613 Spectrum we've designed a simplistic collaboration application which supports:
  - Web Based Access (Not on the NIPRNET)
  - Plain English Graphic User Interface with Alt text description
  - Create frequency request / assignment
  - Modify / Delete frequency assignment
  - Maintain frequency assignment database for each mission
  - Spectrum assigner based on disaster location
  - Various output capabilities
    - Excel , Word or Pub 7 format
  - Google language translator
- Support Non-Government and Other Agencies
- Future Expansion – DISA Global Electromagnetic Spectrum Information System (GEMSIS)

Funding for Mercury

- DISA Joint Spectrum Center
  - Provided initial funding for Research and Development – 180K
  - USPACOM was initially selected to design the software
  - Dreamhammer was awarded a small business contract to developed the software

- Coalition Warfighter Program (CWP)
  - USPACOM submitted “Spectrum Collaboration Application” as a candidate
  - Briefed OSD ATL
  - OSD ATL approved CWP funding for FY 11-13

This is how is works

Something Happens Some Where in the World

Collaboration

- *Military Comm Planners*
- *Non Government Agencies*

- *Spectrum Manager*
- *First Responders*

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This is how it works via the Web (http://mercury.dreamhammer.com/apps)

As of 050800W Dec11

Inbox View

mercury — Spectrum Collaboration Application

Inbox | Requests | Assignments | SM Directory | Users | Logged in as: Robert Marcial | My Info | Sign Out

INBOX

	#	From	Subject	Received at
✖	542	Robert Marcial	New Mercury Spectrum Request USA201100075 from Robert Marcial.	2011-07-22 03:03:40 GMT
✖	506	Robert Marcial	Mercury Spectrum Request USA201100000 status changed to Pending by ...	2011-07-20 00:36:41 GMT
✖	505	Robert Marcial	New Mercury Spectrum Request USA201100000 from Robert Marcial.	2011-07-20 00:35:47 GMT
✖	489	Daniel McNamara	New Mercury Spectrum Request USA201100000 from Daniel McNamara.	2011-07-19 17:37:52 GMT
✖	484	Robert Marcial	Mercury Spectrum Request USA201100000 status changed to Pending by ...	2011-07-19 03:43:53 GMT
✖	483	Robert Marcial	Mercury Spectrum Request USA201100000 status changed to Pending by ...	2011-07-19 03:43:52 GMT
✖	482	Robert Marcial	New Mercury Spectrum Request USA201100000 from Robert Marcial.	2011-07-19 03:41:38 GMT
✖	481	Robert Marcial	Mercury Spectrum Request USA201100000 status changed to Pending by ...	2011-07-18 21:39:57 GMT
✖	480	Robert Marcial	New Mercury Spectrum Request USA201100000 from Robert Marcial.	2011-07-18 21:39:01 GMT
✖	451	MERCURY Administra...	New Comment on the Mercury Request 201100001 from MERCURY Admini...	2011-07-15 22:11:29 GMT
✖	351	Michael Fontenot	New Mercury Spectrum Request USA201100025 from Michael Fontenot.	2011-06-21 02:21:05 GMT
✖	234	MERCURY Administra...	Mercury Spectrum Request 201100001 status changed to Approved by ME...	2011-05-31 19:18:22 GMT
✖	233	MERCURY Administra...	A new Mercury Assignment 20110000100 was created by MERCURY Admi...	2011-05-31 19:18:21 GMT
✖	232	MERCURY Administra...	Mercury Spectrum Request 201100001 was approved by MERCURY Admin...	2011-05-31 19:18:20 GMT
✖	231	Robert Marcial	New Comment on the Mercury Request 201100001 from Robert Marcial.	2011-05-31 19:18:05 GMT
✖	230	MERCURY Administra...	Mercury Spectrum Request 201100001 status changed to by MERCURY A...	2011-05-31 19:17:29 GMT
✖	229	Robert Marcial	New Comment on the Mercury Request 201100001 from Robert Marcial.	2011-05-31 19:17:24 GMT
✖	227	MERCURY Administra...	New Comment on the Mercury Request 201100001 from MERCURY Admini...	2011-05-31 19:16:32 GMT
✖	226	MERCURY Administra...	Mercury Spectrum Request 201100001 status changed to Pending by MER...	2011-05-31 19:16:16 GMT

As of 050800W Dec11

Spectrum Managers Directory

mercury — Spectrum Collaboration Application

Inbox | Requests | Assignments | SM Directory | Users | Logged in as: Robert Marcial | My Info | Sign Out

SPECTRUM MANAGER DIRECTORY

Country: ALL

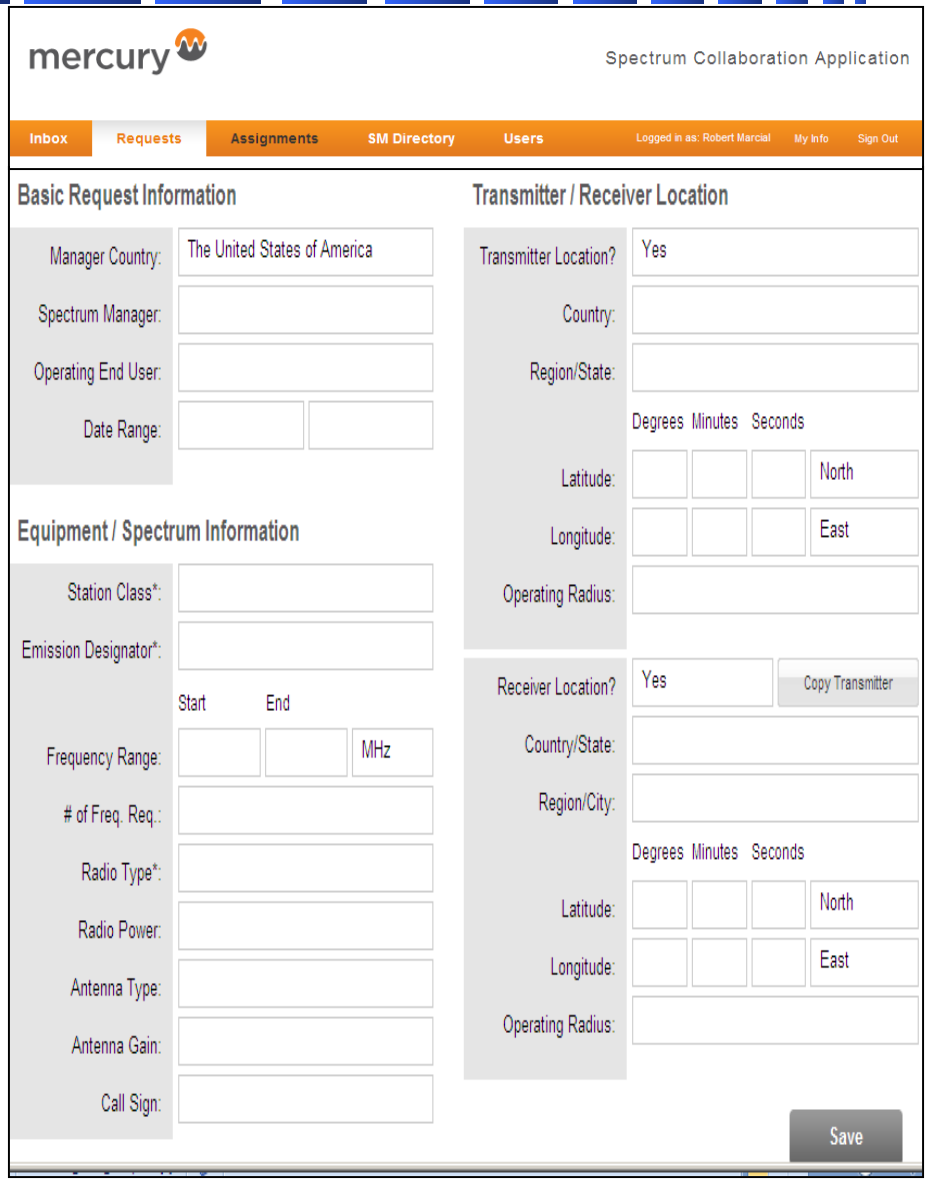
Shakti Jang Basnet	Nepal	basnet_sj@hotmail.com	+977	9841284170
Geoff Boyd	The United States of America	Geoffrey.boyd@hotmail.com		
Kenneth Collette	The United States of America	Kenneth.collette@disa.mil		410-293-9893
Carlos Herrera	The United States of America	carlosh11@gmail.com		213-915-4887
Rommel Juntilla	Philippines (Republic of the)	juntillarb@army.mil.ph	+63	918501777
Jeffrey Kosal	Cambodia (Kingdom of)	jeffrey.Kosal@gmail.coM	+855	977777887
Burt Lancaster	New Zealand	burt.lancaster@nzdf.mil.nz	+64	5296617
Pak Sum Low	Singapore (Republic of)	low_pak_sum@starnet.gov.sg	+65	98776484
Spectrum Manager2	The United States of America	cherrera@dreamhammer.com	+1	703-555-1212
Robert Marcial	The United States of America	robert.marcial@pacom.mil		808 477 7239
Anselm McClain	The United States of America	anselm@weareanyone.com	+1	646-413-2188
Daniel McNamara	The United States of America	daniel.mcnamara@disa.mil	001	410-293-9781
Tom Meccia	The United States of America	thomas.meccia@disa.mil		410.293.9802
Mohd Zabri Hj Idrus	Malaysia	mzabre@gmail.com	+6	0193525050
Dustin Morales	The United States of America	dmorales@dreamhammer.com		714-403-9267
Malachi Outen	The United States of America	malachi.outen@us.army.mil		(410) 293-
Herb Rivera	The United States of America	heriberto.rivera@pacom.mil	+1	3719605

Page 1 of 1 — Displaying 1 - 21 of 21

As of 050800W Dec11

View New Request

- *Each request will consist of five mandatory data entries:*
  - *Managing Authority*
  - *Equipment Location*
  - *Transmitter Location*
  - *Receiver Location*
  - *Data Tracking*
- *List of Spectrum Managers*
- *Drop down menu/manual entries*



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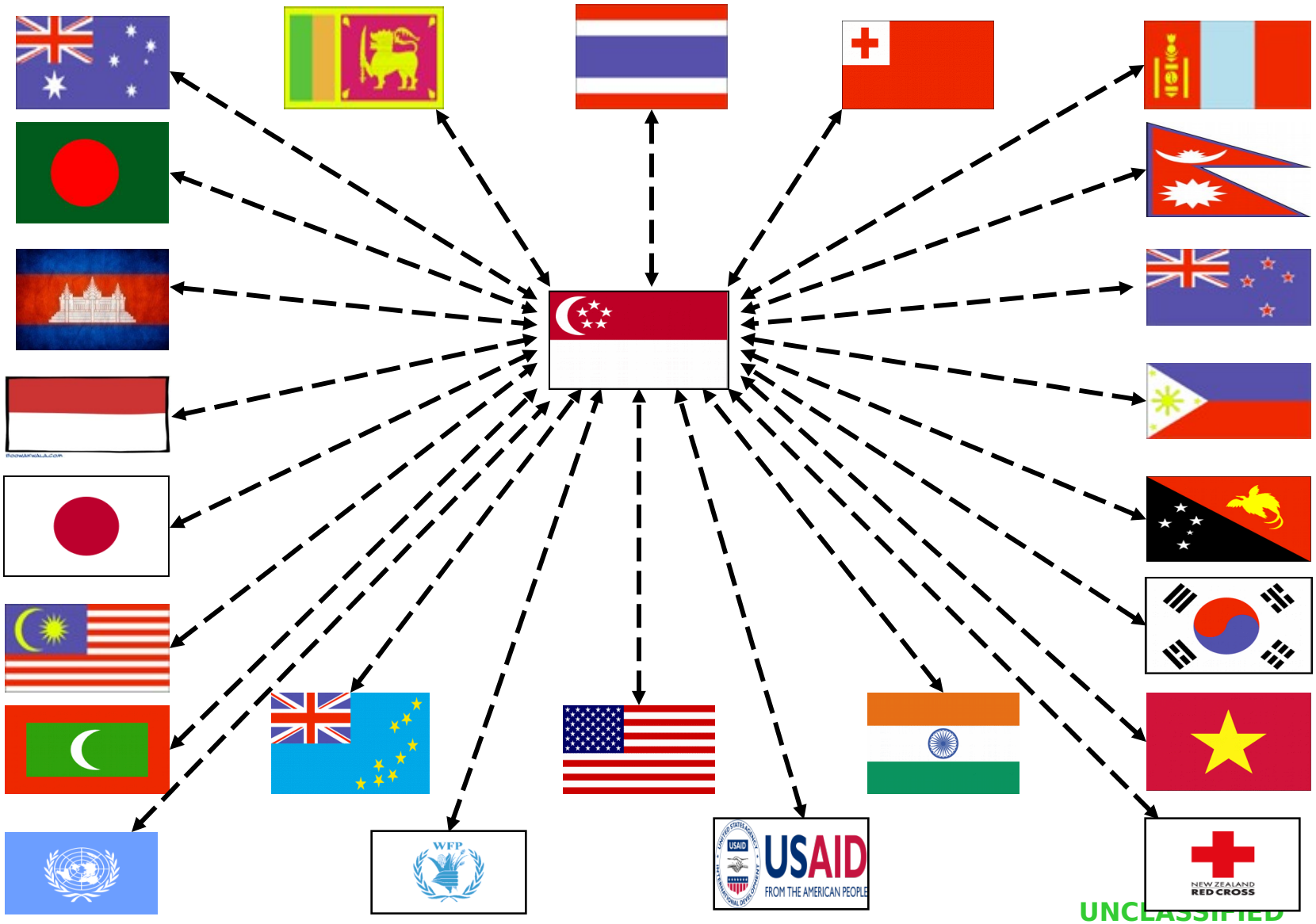
Frequency submission to country in need



View of Assignment

mercury — Spectrum Collaboration Application

Inbox | Requests | Assignments | SM Directory | Users | Logged in as: Robert Marcial | My Info | Sign Out

Frequency Assignment: 37.25 MHz

Basic Information

Assigned to:	Michael Lewis
(email):	michael.o.lewis@us.army.mil
(phone):	+1-4212790
Operating End User:	SOCAFRICA J65
Start Date:	2011-10-24
End Date:	2011-10-28

Equipment / Spectrum Information

Station Class:	Base Station
Emission Designator:	25K0F2E
Radio Type:	AN/PRC-117D(E)
Radio Power:	5 W
Antenna Type:	WHIP
Antenna Gain:	0
Call Sign:	Freq123

Transmitter Location

Country:	Delaware
Region/State:	Stuttgart Army Air Field
Latitude:	484051N
Longitude:	0091201E
Operating Radius:	20KM

Receiver Location

Country:	Delaware
Region/State:	Stuttgart Army Air Field
Latitude:	484051N
Longitude:	0091201E
Operating Radius:	20KM

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View of Assignment in Japanese

mercury

スペクトルのコラボレーションアプリケーション

受信トレイ　リクエスト　割り当て　SMディレクトリ　ユーザーとしてログインロバートMarcial　私の情報　ログアウト

周波数の割り当て： 37.25 MHzの

基本情報

に割り当てられます：	マイケルルイス
（メールアドレス）：	michael.o.lewis @ us.army.mil
（電話）：	+1-4212790
営業エンドユーザー：	SOCAFRICA J65
開始日：	2011年10月24日
終了日：	2011年10月28日

機器/スペクトラム情報

駅のクラス：	ベースステーション
排出量指定子：	25K0F2E
ラジオの種類：	AN/PRC-117D（E）
ラジオの電源：	5 W
アンテナの種類：	WHIP
アンテナ利得：	0
コールサイン：	Freq123

送信機の場所

国：	デラウェア州
地域/州：	シュトゥットガルト軍のエアフィールド
緯度：	484051N
経度：	0091201E
営業半径：	20キロ

受信機の場所

国：	デラウェア州
地域/州：	シュトゥットガルト軍のエアフィールド
緯度：	484051N
経度：	0091201E
営業半径：	20キロ

Conversation Log

S Sgt Randy Lavota replied to the above on 17th of March 2011 at 9:44pm
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam bibendum condimentum diam mattis varius. Fusce mollis nunc est. Ut sit amet turpis lectus, a elementum tortor. Fusce suscipit vehicula rhoncus. Nam facilisis sapien eu arcu hendrerit id egestas sem consectetur. Nullam aliquet congue dolor, at ornare velit dignissim non. Suspendisse neque odio, consequat in lobortis ut, cursus sit

Spectrum Requestor replied to the above on 17th of March 2011 at 12:15pm
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam bibendum condimentum diam mattis varius. Fusce mollis nunc est. Ut sit amet turpis lectus, a elementum tortor. Fusce suscipit vehicula rhoncus. Nam facilisis sapien eu arcu hendrerit id egestas sem consectetur. Nullam aliquet congue dolor, at ornare velit dignissim non. Suspendisse neque odio, consequat in lobortis ut, cursus sit

S Sgt Randy Lavota replied to the above on 17th of March 2011 at 1:04pm
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Leave a comment...

Submit

Tracking log in Native Language (Google Translator)

Beginning to End Cycle

Distribute Assignment

Log into Mercury

Select Spectrum Manager

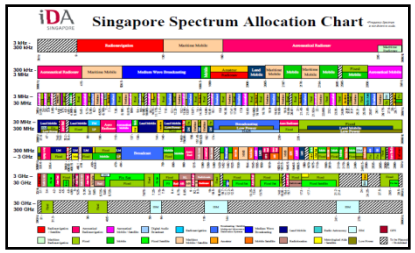
Prepare Frequency Request

Submit to Desired Country

Wait for Reply

Process Assignment

National Level Coordination



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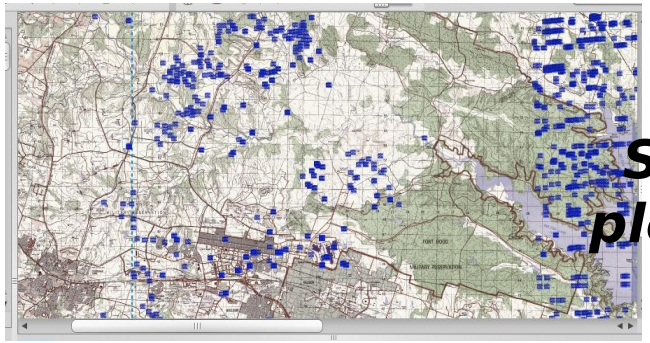
Projected Capabilities



Situational Awareness for responders by plotting all frequency assignments on map

Access to “Mercury” software via smart pho

Compatible with GEMSIS “Category of Services” and Multinational Communications Interoperability Guid

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Summary of "Mercury" Way Ahead FY 12

- Who: USPACOM J613, DISA JSC/JITC and Dreamhammer
- What: Mercury Meeting
- When: 6 - 7 December 2011
- Where: San Diego CA
- Topics of Discussion:
  - ✓ Multinational Communications Interoperability Guide and Mercury database merge
  - ✓ Finalize all dropdown menus
  - ✓ Security constraint to protest "Mercury" from authorized users
  - ✓ Prioritization of future Mercury enhancement
  - ✓ Identify costs associated with host servers, care and maintenance at the C2 Centre Singapore
  - ✓ Deadline schedule to meet Exercise Pacific Endeavor Aug 2012

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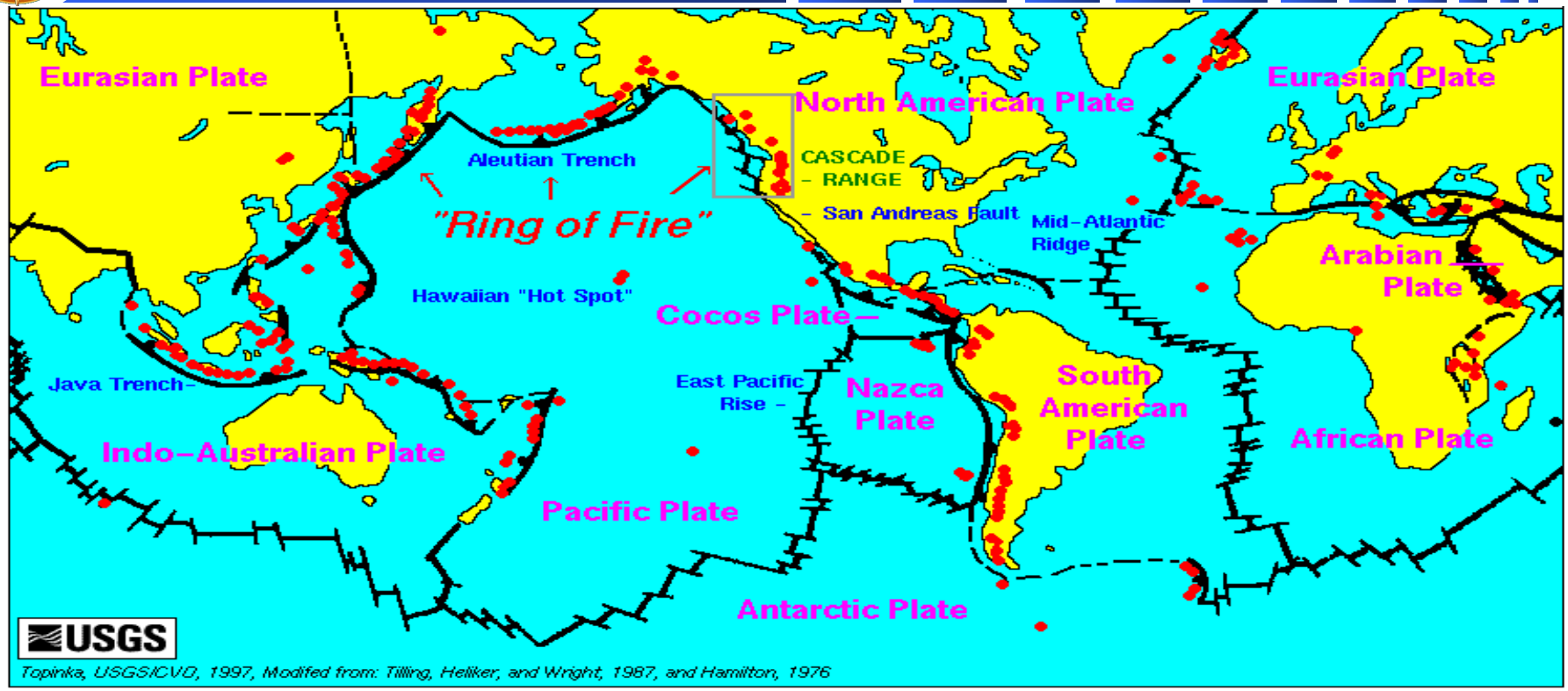
"The Ring of Fire"



We may not be able to "Predict" when and where the next disaster will occur but we must take steps to ensure the electromagnetic spectrum interference does not contribute to the loss of human life!

As of 050800W Dec11

2012 Pacific Spectrum Management Conference

40th Anniversary

23- 27 July – Ala Moana Hotel

Today's Challenges

- National level and Combatant Commands continues to defend current allocations reserved for day-to-day operations
- Spectrum reallocation / auction continues to erode peacetime training worldwide
- Experimental systems used in Iraq and Afghanistan will soon be appearing in CONUS / OCONUS and may not be supportable
- Technology continues to be developed in frequency bands which are no longer available worldwide

Today's Challenges

- *No emphasis is being placed on the electromagnetic spectrum usage by operators, technicians and logisticians within CONUS / OCONUS*
- *Electronic Warfare cannot be fully optimized during peacetime do to host nation reluctance to approve*
- *Electromagnetic Interference reporting stovepipes*
- *Professional career path for civil service needs to be developed*
- *Pacific AOR is now the highest interest within DoD*

Today's focus is "Cyber" and not "Spectrum", without paying attention to the electromagnetic spectrum resources cyber operations may suffer, networks may collapse and eventually our adversary will master this critical asset by denying us access

U.S. Pacific Command Spectrum Management Points of Contact

As of 050800W Dec11

HQ USPACOM J613
Joint Frequency Management Office Pacific
PO Box 64029
Camp H.M. Smith HI, 96861-64029

Group NIPRNET Address: JFMOPAC@pacom.mil
Group SIPRENT Address: JFMOPAC@pacom.smil.mil
Facsimile Number: DSN 315-477-7214

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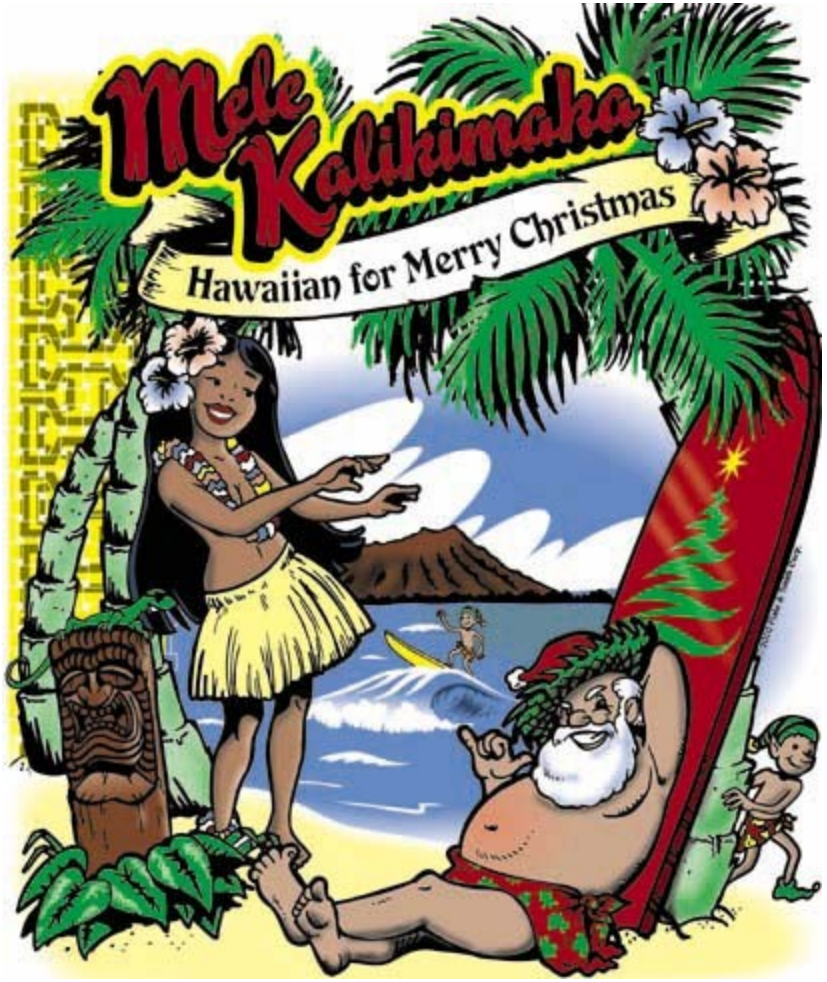
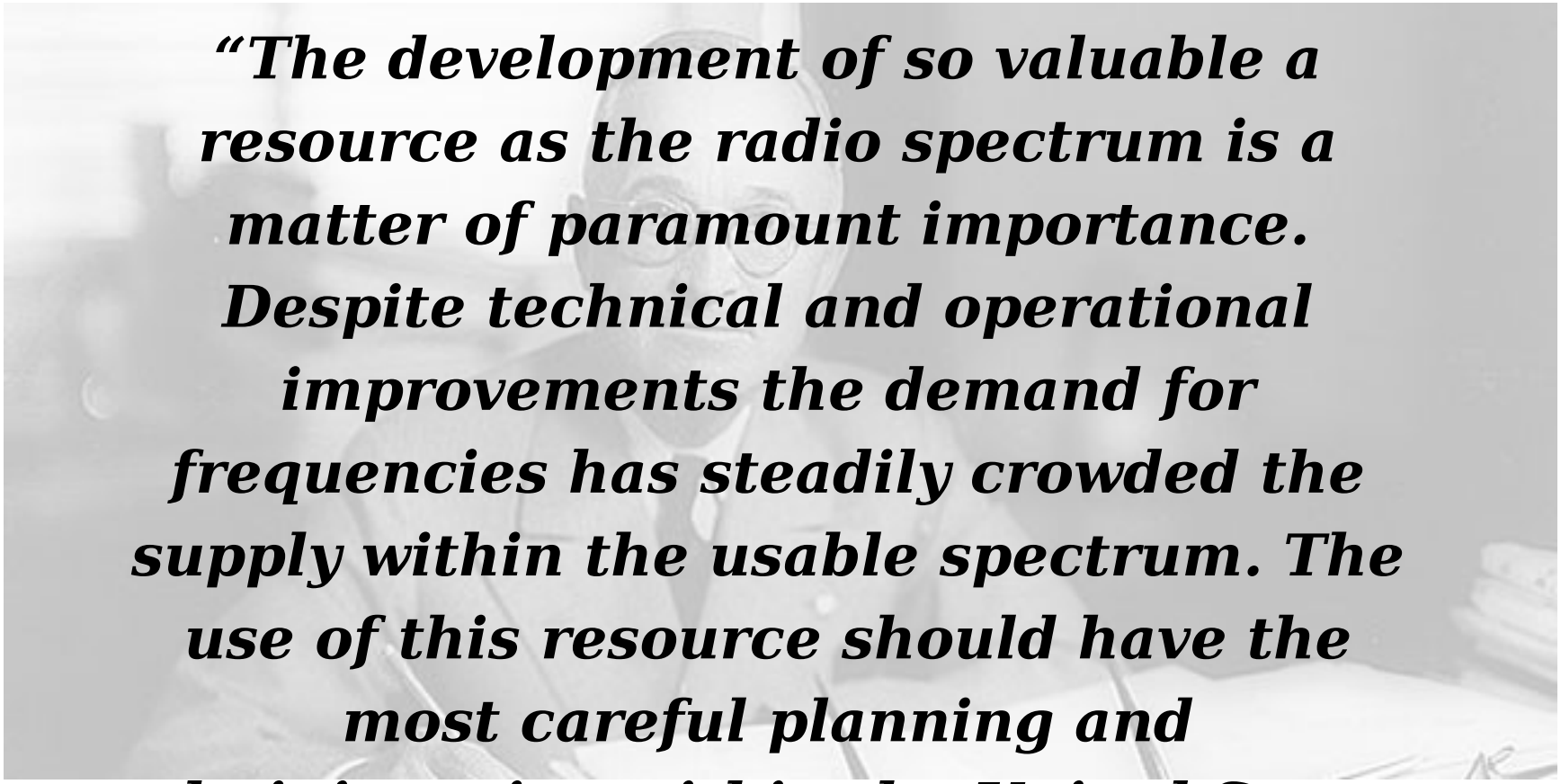
Questions

SPECTRUM
$f = \frac{v}{\lambda}$
MARSHAL


Mele Kalikimaka
Hawaiian for Merry Christmas

Written in 1951 by President TRUMAN'S policy board



"The development of so valuable a resource as the radio spectrum is a matter of paramount importance. Despite technical and operational improvements the demand for frequencies has steadily crowded the supply within the usable spectrum. The use of this resource should have the most careful planning and administration within the United States and in cooperation with other countries. Unfortunately, guidance and

Backup Slides

As of 050800W Dec11

USPACOM Spectrum Management Major Events/ Efforts/Accomplishments for 2012

- **Who: U.S. Pacific Command Components**
  - Joint Frequency Management Office Pacific (4 Quotas)
  - U.S. Army Pacific; Ft Shafter (3 Quotas)
  - U.S. Pacific Fleet, Pearl Harbor/NMCSO PAC (3 Quotas)
  - Commander, Marine Forces Pacific (4 Quotas)
  - HQ Pacific Air Forces (2) Quotas)
- **What: Spectrum XX1 Online Training**
- **Where: Hickam Air Force Base**
- **When: 17-28 January 2012**

As of 050800W Dec11

USPACOM Spectrum Management Major Events/ Efforts/Accomplishments for 2012

- **Who: United States Forces Japan**
  - Joint Frequency Management Office Japan (12 Quotas)
- **What: Spectrum XX1 Online Training**
- **Where: Yokota AB Japan**
- **When: 6 - 17 February 2012**

As of 050800W Dec11

USPACOM Spectrum Management Major Events/ Efforts/Accomplishments for 2012

- **Who: United States Forces Korea**
  - Joint Frequency Management Office Korea (24 Quotas)
- **What: Spectrum XX1 Online Training**
- **Where: Seoul Korea**
- **When: To be Determined**

As of 050800W Dec11

USPACOM Spectrum Management Major Events/ Efforts/Accomplishments for 2012

- **Who: Commander, Alaskan Command, ALCOM**
  - Joint Frequency Management Office Alaska (2 Quotas)
  - 673 CS Joint Base Elmendorf Richardson (1 Quota)
  - 354th CS Eielson Air Force Base (1 Quota)
  - 11th Air Force (1 Quota)
  - 611th Air Operations Group (1 Quota)
  - HQ U.S. Army Alaska (1 Quota)
- **What: Spectrum XX1 Online Training**
- **Where: Joint Base Elmendorf Richardson, HQs Alaskan Command,**
- **When: To be Determined**